Ordering number: EN 2636C

No. 2636C

SANYO

Monolithic Linear IC

LA4446

Car Stereo-Use 5.5W 2-Channel AF Power Amp

Features

- Dual channels
  Output: 5.5Wx2(typ)
- Low pop noise at the time of power supply ON/OFF and good starting balance
- Good ripple rejection: 46dB(typ)
- Good channel separation
- Low residual noise (Rg=0)
- On-chip protectors
  a. Thermal protector
  b. Overvoltage/surge protector
  c. Adjacent pins (7-8, 6-7) short protector

Maximum Raings at Ta=25°C

				unit
Maximum Supply Voltage	V_{CC} max1	Quiescent (t=30s)	25	V
	V_{CC} max2	Operating	18	V
Surge Supply Voltage	V_{CC} surge	t≦0.2s	50	V
Maximum Output Current	Io peak	Per channel	3.5	A
Allowable Power Dissipation	Pd max	See Pd max – Ta characteristic.	15	W
Operating Temperature	Topr		−20~+75	°C
Storage Temperature	Tstg		−40~+150	°C

Operating Conditions at Ta=25°C

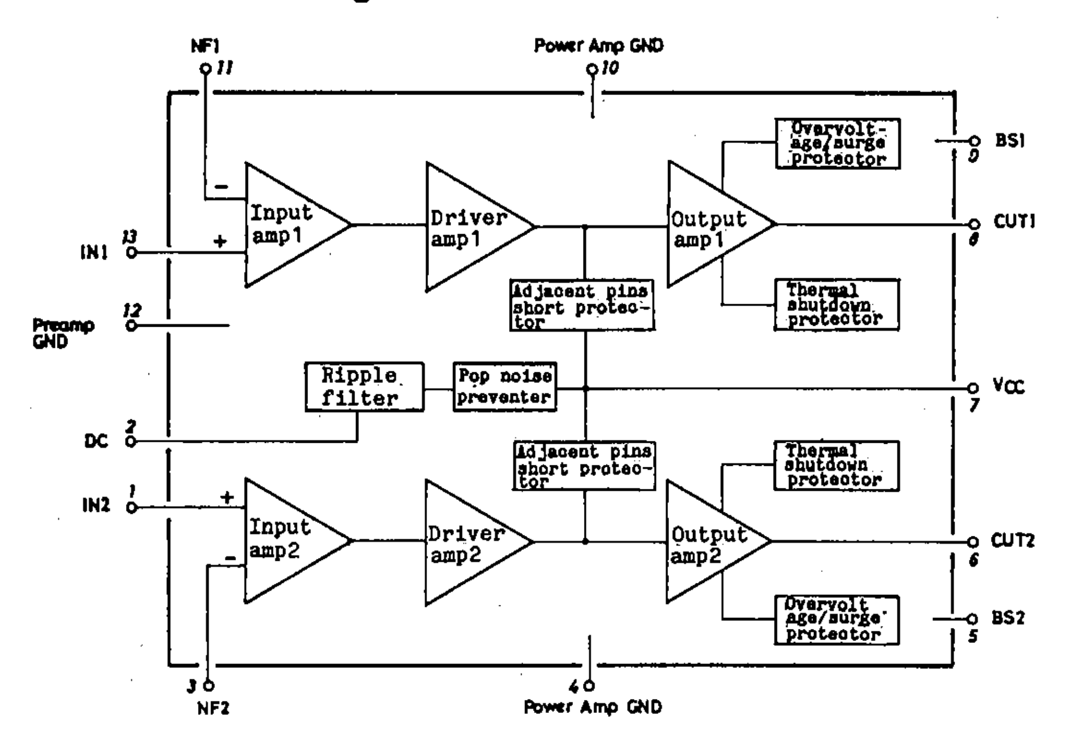
				unit
Recommended Supply Voltage	V_{CC}		13.2	V
Recommended Load Resistance	R_L	2 channels	4	Ω
Operating Voltage Range	V_{CC} op		10~16	V

Operating Characteristics at Ta=25°C, V_{CC}=13.2V, R_L=4Ω, f=1kHz, Rg=600Ω, with 100×100×1.5mm³ Al heat sink

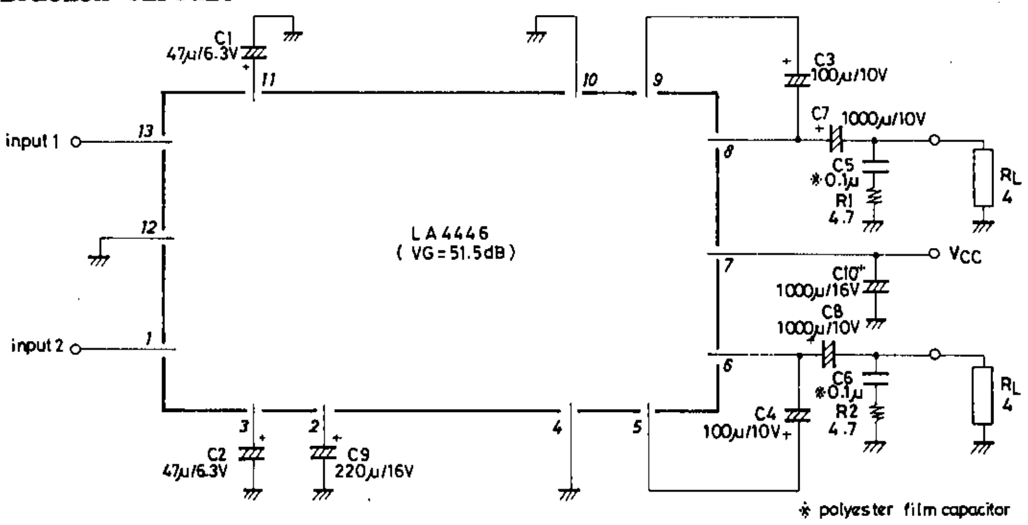
			min	typ	max	unit
Quiescent Current	Icco			75	150	mA
Voltage Gain	VG		49.5	51.5	53.5	dB
Output Power	Po	THD=10%, 2 channels	5.0	5.5		W
Total Harmonic Distortion	THD	Po=1W		0.2	1.0	%
Input Resistance	ri			30		kΩ
Output Noise Voltage	V_{NO}	Rg=0		0.6	1.0	mV
	V_{NO}	Rg=10kΩ		1.0	2.0	mV
Ripple Rejection	SVRR	Rg=0, V_{CCR}=200mV, fr=100Hz		46		dB
Channel Separation	CHsep	Rg=10kΩ, Vo=0dBm	45	55		dB

Package Dimensions 3107
(unit : mm)

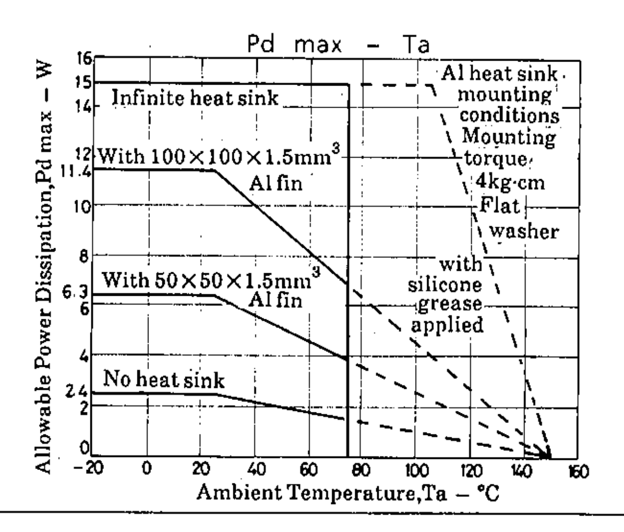
Equivalent Circuit Block Diagram



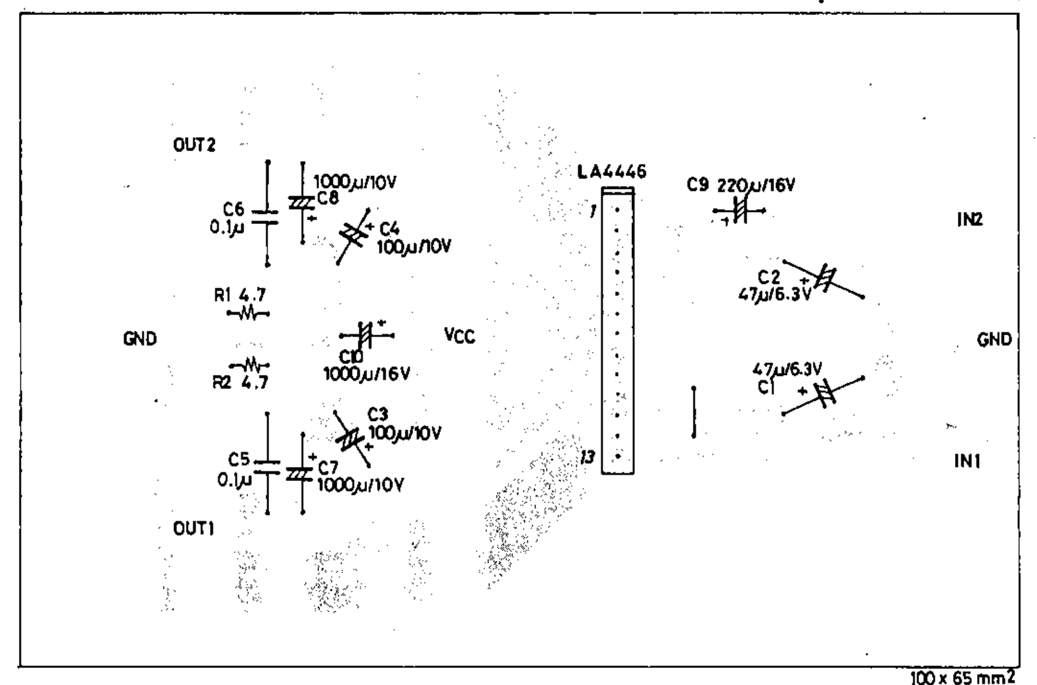
Sample Application Circuit



Unit (resistance: Ω, capacitance: F)



Sample Printed Circuit Pattern (Cu-foiled area) Unit (resistance: Ω, capacitance: F)



※ Mounting the heat sink, use a flat screw. Mouting torque : 4 to kg·cm

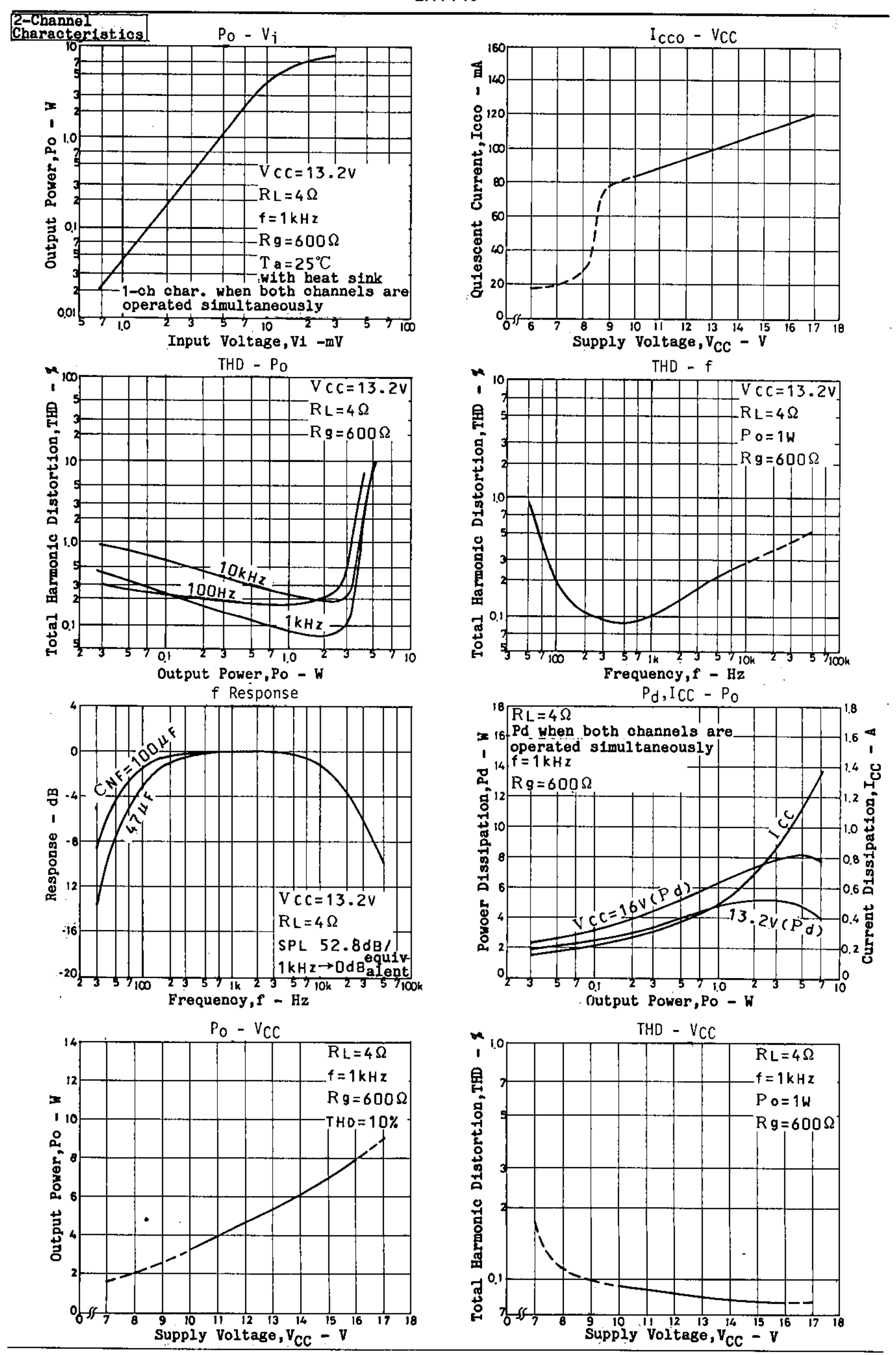
Features of IC System

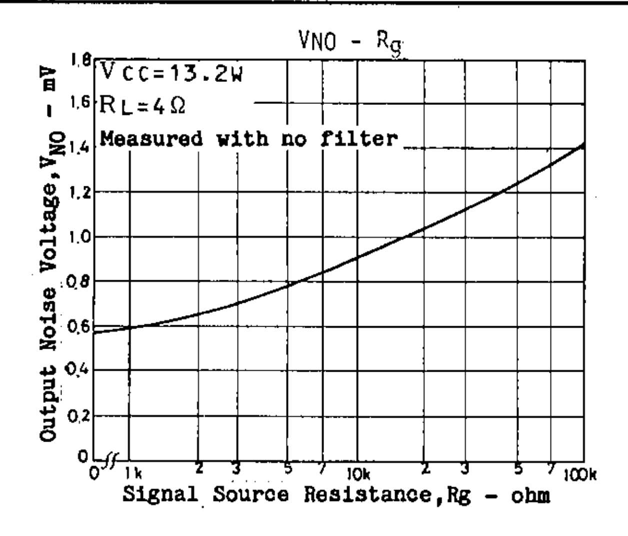
- 2-channel use
- Decoupling capacitor C9=220uF is used to reject ripple and determine the delay time at the time of application of power.
- A low roll-off frequency depends on the NF capacitor. Refer to the graph. To extend f_L, the output capacitor must be also considered.
- To make the pop noise much less, connect R_{NF}' to NF capacitors C1, C2 to decrease the gain.

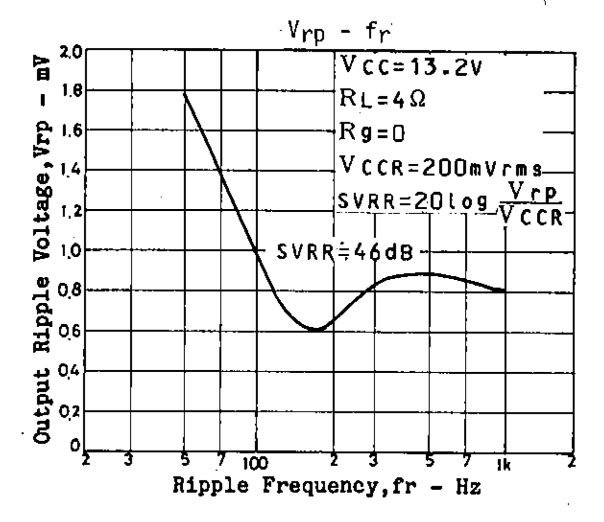
$$VG \fallingdotseq 20\log\frac{Rf}{R_{NF}} \text{ [dB]} \qquad R_{NF} \fallingdotseq 50\,\Omega,\ Rf=20\,k\Omega \text{ on chip}$$

When R_{NF}'=50ohms is connected to NF capacitors C1, C2 externally, the gain becomes approximately 46dB. When R_{NF}'=150ohms is connected additionally, the gain becomes approximately 40dB.

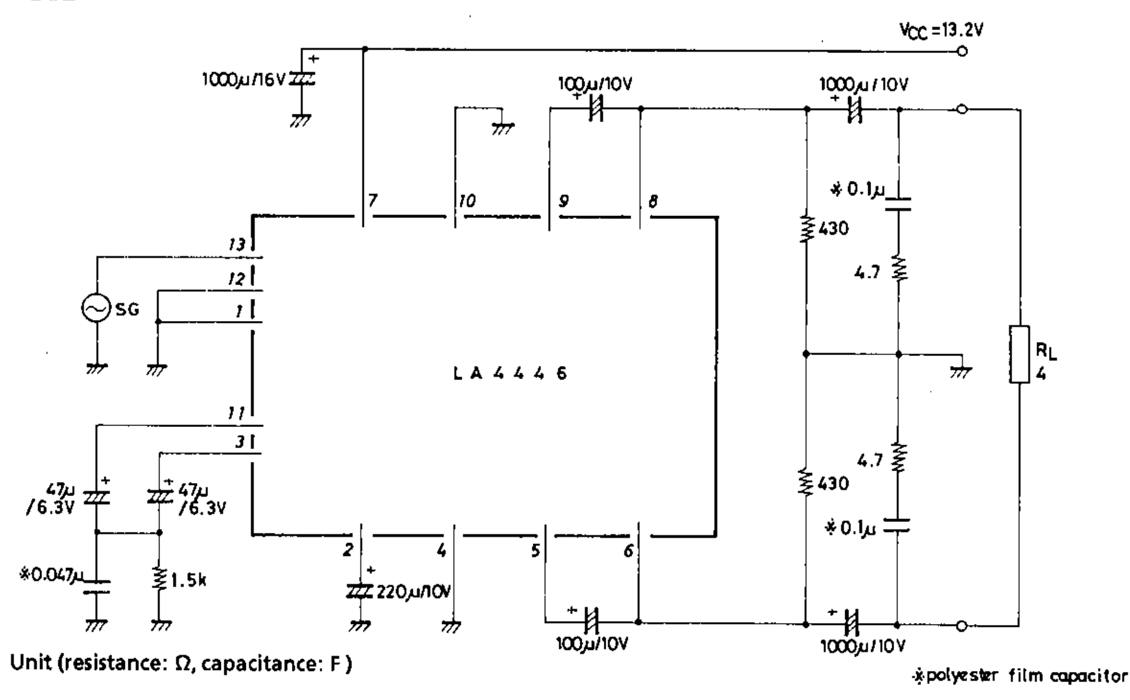
- Ripple rejection, total harmonic distortion, and oscillation depend on the layout of the printed circuit board. Large-signal GND, small-signal GND processing and parts GND points must be considered particularly.
- When providing external audio muting intentionally, the IC can be cut off by connecting decoupling pin ② to GND through limiting resistor 50 to 100ohms.
- The V_{CCout} pin adjacent to other pins with a space of 2mm pitch is liable to undergo breakdown caused by solder bridge in the manufacturing process. Therefore, pins ⑦-⑧, ⑦-⑥ DC short protectors are contained. The LA4446 is designed to operate from car-use voltage regulation 10.5 to 15.6V.
- Overvoltage/surge protector
  Used to withstand giant pulses of positive surge 50V/200msec. The test is conducted based on the JASO standard in principle. The overvoltage protector is activated at $V_{CCX} \fallingdotseq 24.5V$.
- Thermal protector
  Used to prevent instantaneous breakdown of the IC that may be caused by improper thermal design or abnormal state such as AC load short. The thermal protector is activated at $Tj=160^oC$.


2-Channel Characteristics
Po - Vi
Output Power,Po - W
Input Voltage,Vi -mV
VCC=13.2V
RL=4Ω
f=1kHz
Rg=600Ω
Ta=25℃
with heat sink
1-ch char. when both channels are operated simultaneously
Icco - VCC
Quiescent Current,Icco - mA
Supply Voltage,VCC - V
THD - Po
Total Harmonic Distortion,THD - %
Output Power,Po - W
VCC=13.2V
RL=4Ω
Rg=600Ω
10kHz
100Hz
1kHz
THD - f
Total Harmonic Distortion,THD - %
Frequency,f - Hz
VCC=13.2V
RL=4Ω
Po=1W
Rg=600Ω
f Response
Response - dB
Frequency,f - Hz
CNF=100μF
47μF
VCC=13.2V
RL=4Ω
SPL 52.8dB/
1kHz→0dB equivalent
Pd,ICC - Po
Powoer Dissipation,Pd - W
Current Dissipation,ICC - A
Output Power,Po - W
RL=4Ω
Pd when both channels are operated simultaneously
f=1kHz
Rg=600Ω
ICC
VCC=16V(Pd)
13.2V(Pd)
Po - VCC
Output Power,Po - W
Supply Voltage,VCC - V
RL=4Ω
f=1kHz
Rg=600Ω
THD=10%
THD - VCC
Total Harmonic Distortion,THD - %
Supply Voltage,VCC - V
RL=4Ω
f=1kHz
Po=1W
Rg=600Ω



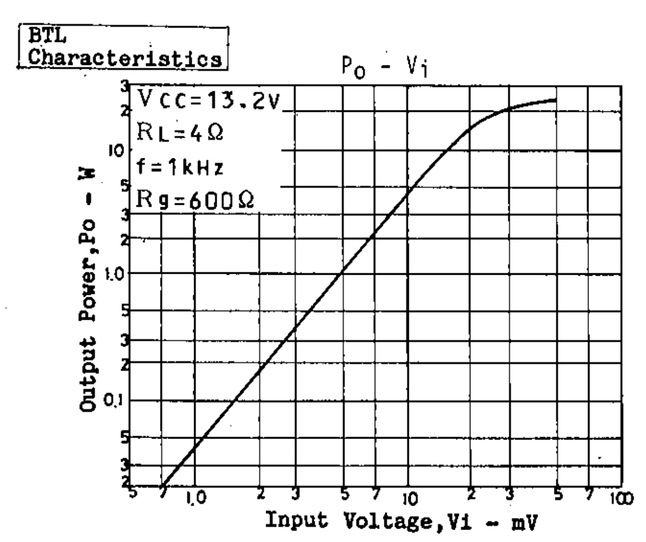


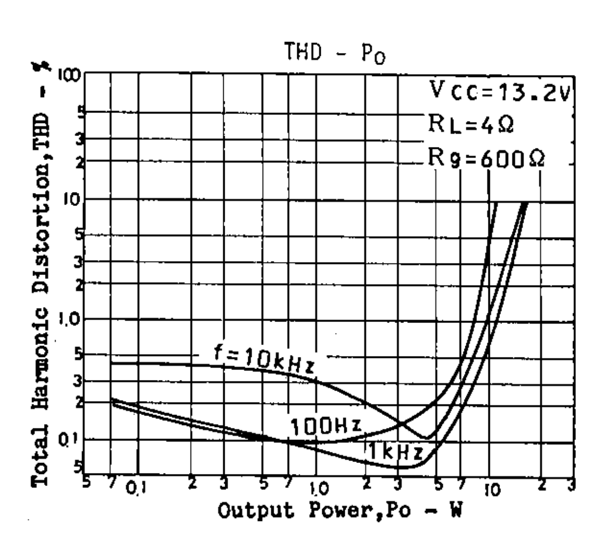
Sample BTL

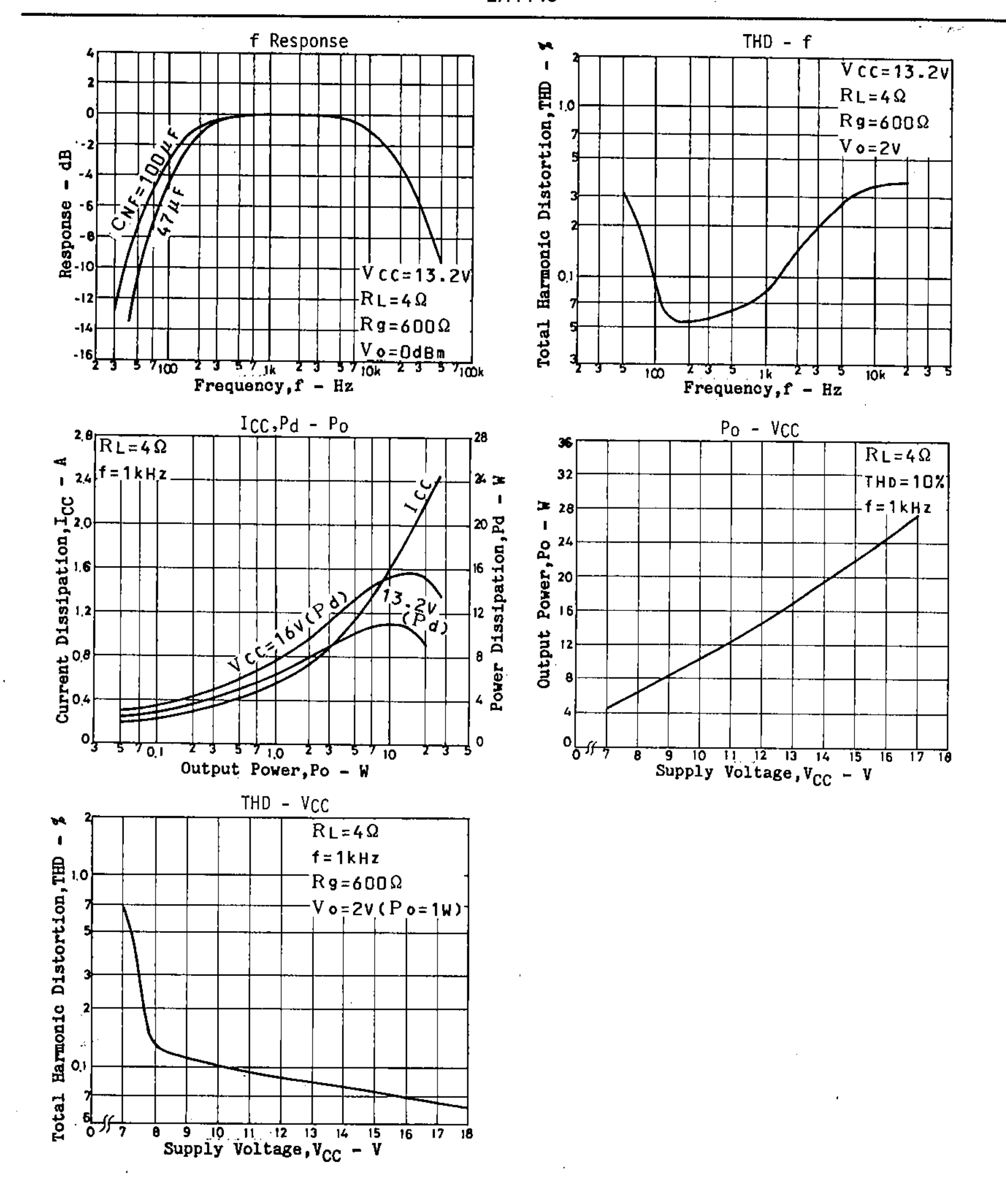


Unit (resistance: Ω, capacitance: F)

BTL Characteristics






f Response
Response - dB
Frequency, f - Hz
CNF=100μF
47μF
VCC=13.2V
RL=4Ω
Rg=600Ω
Vo=0dBm
THD - f
Total Harmonic Distortion, THD - %
Frequency, f - Hz
VCC=13.2V
RL=4Ω
Rg=600Ω
Vo=2V
ICC, Pd - Po
Current Dissipation, ICC - A
Power Dissipation, Pd - W
Output Power, Po - W
RL=4Ω
f=1kHz
ICC
VCC=16V(Pd)
13.2V (Pd)
Po - VCC
Output Power, Po - W
Supply Voltage, VCC - V
RL=4Ω
THD=10%
f=1kHz
THD - VCC
Total Harmonic Distortion, THD - %
Supply Voltage, VCC - V
RL=4Ω
f=1kHz
Rg=600Ω
Vo=2V(Po=1W)